

### REMARKS

This amendment is responsive to the non-final Office Action of March 27, 2008. Reconsideration and allowance of the claims 1-17 are requested.

#### The Office Action

Claims 1-8 stand rejected under 35 U.S.C. § 112, second paragraph, and under 35 U.S.C. § 103 as being unpatentable over Ogino (US 6,985,613) in view of Salem ("X-Ray Computed Tomography Methods..."), further in view of Petrillo (US 6,327,546).

Claims 9 and 10 stand rejected under 35 U.S.C. § 103 as being unpatentable in view of Ogino in view of Salem, further in view of Petrillo.

#### The Cited References

The cited references do not disclose that which the Examiner asserts.

**Ogino** is directed to a magnetic resonance imaging system, not a time of flight PET system. Ogino is interested in enhancing small vessels in maximum intensity projection images and does not determine tracer element concentration. While the magnetic resonance imaging system does use a magnetic resonance contrast agent to enhance the blood, the magnetic resonance contrast agents function by altering resonance properties and do not generate or determine time of flight information.

**Salem** suggests generating a series of x-ray CT diagnostic images and evaluating them for the transport of platinum-containing drugs. Salem correlates a concentration directly from CT intensities in the images. Salem is devoid of any suggestion of using PET, time of flight PET, or determining PET tracer concentrations from time of flight PET data.

**Petrillo** discloses a PET imaging system. Petrillo makes no suggestion of and does not disclose a PET system which performs time of flight analysis or imaging. As is well known in PET imaging, pairs of "coincident" events are identified. Pairs of coincident events are those which are received within a sufficiently small temporal window so that they may be attributed to the same

annihilation event. If the coincidence windows are different sizes for different detectors, then those detectors with a larger coincidence window will receive a disproportionately large number of counts and those with a disproportionately small coincidence window will receive a disproportionately small number of counts. Such inconsistent increasing and decreasing of radiation events can cause severe image artifacts. Petrillo is concerned with a calibration technique for calibrating photomultiplier tube based PET imaging systems.

The three imaging systems described by Ogino, Salem, and Petrillo each work in a different way to achieve different results for a different purpose. There is no motivation within these references to combine them with each other, much less to combine them in a manner analogous to the present application.

**The Claims Distinguish Patentably  
Over the References of Record**

**Claim 1** calls for an image producing device. Ogino discloses an imaging device, particularly an MR imaging device for generating three-dimensional MR images. Salem discloses a CT imaging device for producing three-dimensional CT images. Petrillo discloses a PET imaging device for generating 3D PET images.

**Claim 1** calls for a TOF-PET unit for recording the concentration of a PET tracer. Ogino discloses an MR imaging system, not a time of flight imaging system. Rather, as indicated above, Ogino discloses a magnetic resonance image producing device which generates 3D MR images and does not determine a concentration of a PET tracer. Salem does not disclose a TOF-PET unit and does not disclose recording a concentration of a PET tracer. Rather, Salem is directed to a CT image producing device which generates 3D CT images and which purports to determine the concentration of a carboplatin containing drug from the CT data itself. Petrillo does not disclose a TOF-PET unit and does not record the concentration of a PET tracer. Rather, Petrillo discloses a conventional PET system which neither measures time-of-flight nor records a concentration of the PET tracer.

Thus, all three applied images disclose an image producing device and none of the three applied references disclose a TOF-PET unit for recording a concentration of a PET scanner. Thus, all of the references have the same shortcoming and none overcome the shortcoming of the others.

Claim 1 further calls for a data processing unit which determines a spatial position of a body volume that is filled with blood and positions the TOF-PET unit such that the volume element of the TOF-PET unit lies in the blood filled body volume. All three references disclose a data processing unit, but none of the data processing units perform the functions set forth in claim 1. The data processing unit of Ogino enhances small blood vessels in MIP images and does not determine a spatial position of a body volume filled with blood or detector element positions of a TOF-PET unit such that its volume element lies in the blood filled body volume. Salem determines the local carboplatin concentration, i.e., the concentration of the pharmaceutical at its uptake or targeted delivery location. Salem does not find a blood filled body volume and position for a time of flight PET unit such that the time of flight PET unit's volume element lies in such blood filled body volume. Petrillo does not disclose determining a spatial position of a blood filled body volume and the position of detector elements of a TOF-PET unit such that the volume element of the TOF-PET unit lies in such blood filled body volume.

Thus, none of the references of record either disclose a data processing unit which functions as claimed in claim 1, nor provides motivation to modify the data processing unit of one of the other cited references to perform such functions. Accordingly, it is submitted that **claim 1 and claims 2-8, 11 and 17 dependent therefrom** distinguish patentably and unobviously over the references of record.

**Claim 9** calls for producing at least one locally resolved image of a body region. All three applied references produce a locally resolved image of a body region.

However, claim 9 goes on to call for the determination of the spatial position of a body volume filled with blood on the basis of the image produced. While there may or may not be a body volume filled with blood in the image produced by any one of the three applied references, none of the three applied references suggest that one should identify or determine the spatial position of such a blood filled body volume.

Claim 9 further calls for recording annihilation quanta coming out of the body volume taking into account their times of flight. None of the three applied

references disclose or fairly suggest recording annihilation quanta coming out of a blood filled body volume taking into account their times of flight.

Accordingly, it is submitted that **claim 9 and claim 10 dependent therefrom** distinguish patentably and unobviously over the references of record.

New **claims 12-14** have been presented to protect the present concepts more completely. Method claim 12 is more detailed than above-discussed method claim 9 and distinguishes more forcefully over the three references for reasons discussed in conjunction with claim 9 and others. Accordingly, it is submitted that **claim 12 and claims 13-16 dependent therefrom** distinguish patentably and unobviously over the references of record.

#### 35 U.S.C. § 112

Claims 1-8 have been amended to resolve potential 35 U.S.C. § 112 issues and place them in more idiomatic English without significantly altering the scope of the claims. With these amendments, it is submitted that all claims comply with the requirements of 35 U.S.C. § 112.

#### Formal Drawings

The applicants are enclosing a sheet of Replacement Drawings, in which boxes 4, 5, 6, and 7 have been labeled. In order to fit the label "PET" in box 4, box 4 has been expanded in width. Also, because there is only a single Figure, the "Fig. 1" legend has been deleted. The specification properly references "the Figure" rather than "Fig. 1".

#### Submission of Additional Prior Art

In the prosecution of the corresponding Chinese application, the Chinese Examiner cited the references listed on the attached Information Disclosure Statement by Applicant. The applicant was not provided with a translation of either reference. We understand from the Chinese Examiner that the first reference (L1) discloses a PET-CT scanner which is used to image fluorodeoxyglucose (FDG). We note that PET, CT, FDG, and other key English words appear in Roman text. We further note that TOF does not appear in the text. Thus, although the Chinese

Examiner asserts that this reference discloses a time of flight PET scanner, we question the accuracy of this statement. The Chinese associate has confirmed that LI discloses PET-CT, but did not corroborate the Chinese Examiner's assertion that it discloses TOF-PET.

The Chinese Examiner asserts that the second reference (LIU) discloses a PET probe which uses  $\text{CaF}_2$  crystals.

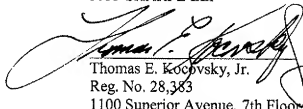
**CONCLUSION**

For the reasons set forth above, it is submitted that all claims distinguish patentably over the references of record and meet all statutory requirements. An early allowance of claims 1-17 is requested.

In the event the Examiner considers personal contact advantageous to the disposition of this case, she is requested to telephone Thomas Kocovsky at (216) 861-5582.

Respectfully submitted,

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